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THE COST OF FREEDOM OF CHOICE: EVIDENCE FROM A PUBLIC PROCUREMENT AUCTION

Master's thesis

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Abstract

Is offering freedom of choice to patients reasonable? In my thesis I study, how offering freedom of choice to patients impacts offers that providers bid in procurement auctions. I execute this by comparing Kela's and Finnish municipalities' procurement data of physiotherapy services.

Both Kela and municipalities procure physiotherapy services by organizing auctions. The two procurement are similar regarding the designs but Kela allows patients to choose the service provider they want. Municipalities, on the other hand, are allocating patients so that the lowest bidder gets its capacity filled first and then the second lowest bidder and so forth. This increases the incentives to bid lower prices as the lower the bid, the higher is the probability to get patients.

I have data of Kela's procurement auctions of physiotherapy services in 2006, 2010 and 2014 and procurement auctions of municipalities from 2010 to 2017. I compare the offers of the procurement auctions and find that bids to Kela's auctions are on average lower than bids to municipalities' auctions. However, when comparing only offers that are comparable, the average offer of municipalities decreases below the average offer of Kela. Kela's bids are on average lower probably because a big part of the auctions was organized before the municipalities' auctions and prices increase already because of inflation.

The results of my study indicate that physiotherapy services procured by Kela are more expensive than services procured by municipalities. Therefore, offering the freedom of choice could be rethought and further studied with more extensive data.

Keywords Public Procurement, Freedom of Choice, Physiotherapy, Kela, Municipalities, Procurement auctions

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Onko valinnanvapauden tarjoaminen potilaille perusteltua? Tutkielmassani tarkastelen valinnanvapauden vaikutusta hintoihin, joita palveluntarjoajat tarjoavat julkisissa hankinnoissa. Toteutan tämän vertailemalla Kelan ja Suomen kuntien fysioterapiahankintoja.

Sekä Kela että kunnat hankkivat fysioterapiapalveluita kilpailuttamalla. Kilpailutukset toteutetaan samoja kriteereitä käyttäen, mutta Kela tarjoaa potilailleen vapauden valita haluamansa palveluntarjoajan. Sen sijaan kunnilla alhaisimman hinnan tarjonneen palveluntarjoajan kapasiteetti täytetään ensin, sen jälkeen toisiksi alhaisimman ja niin edelleen. Kuntien tapa kannustaa tarjoamaan alhaista hintaa, sillä se nostaa todennäköisyyttä saada potilaita.

Vertailen Kelan dataa julkisista fysioterapiahankinnoista vuosilta 2006, 2010 ja 2014 sekä kuntien dataa vuodesta 2010 vuoteen 2017. Kelan kaikkien tarjousten keskiarvo on alle kuntien tarjousten keskiarvon, mutta tarkasteltaessa keskenään vertailukelpoisia tarjouksia, kuntien keskitarjous laskee alle Kelan keskitarjouksen. Todennäköisesti Kelan kaikkien tarjousten keskiarvo on matalampi, sillä suurin osa Kelan hankinnoista on järjestetty ennen kuntien hankintoja ja hinnat nousevat jo inflaation vaikutuksesta vuosittain.

Tutkimukseni tulokset viittaavat siihen, että Kelan hankkimat fysioterapiapalvelut ovat kalliimpia kuin kuntien hankkimat palvelut. Tämän takia valinnanvapauden tarjoamista voitaisiin harkita uudestaan ja sitä olisi hyvä myös tutkia lisää kattavammalla aineistolla.

Avainsanat Julkinen hankinta, valinnanvapaus, fysioterapia, Kela, kunnat, kilpailutus

The Cost of Freedom of Choice: Evidence from a Public Procurement Auction

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Contents

1 Introduction

The reform of health and social care in Finland ("Sote") has been a largely disputed topic for many years. One topic related to the discussions is patients' freedom of choice, which means giving patients right to choose the service provider they want from a range of providers, regardless of whether the service provider is private or public.

There is not much empirical research on the topic of freedom of choice. Therefore, I think that it is important to take a deeper look at what the freedom of choice actually means, and how adding more choice affects the health and social care and their costs before choices of reforms are made.

I will study physiotherapy procurement of Kela and of Finnish municipalities to exploit a difference in the procurement rules: Kela's patients are able to choose the service provider after the procurement, whereas in municipalities, the patients are distributed to the lowest bidder.

My hypothesis is that the freedom of choice offered to patients increases the bids of procurement auctions. That is because it decreases the incentives to bid the winning offer since bidding the lowest does not correlate with the number of patients the service provider will get. However, the positive effect is that it might lead companies to increase the quality of their services. When patients choose the service provider they want without having to pay attention to the prices, as the service is reimbursed to them, they are choosing the service provider, they think, has the best quality.

The topic is also interesting since public procurement is highly important for the economy. In Finland, the value of public procurement per year is nearly 30 billion euros, which is almost 20 % of Finland's Gross Domestic Product (Confederation of Finnish Industries).

In this research, I will concentrate only on procurement of physiotherapy services of municipalities, federations of municipalities and the Social Insurance Institution ("Kela"), which is a Finnish government agency.

In 2017 there were 1 158 procurement done by authority of the government or public utilities, which were worth circa 796 million euros and 8 990 procurement of municipalities, federations of municipalities or other regional authorities, which were worth over 11 700 million euros. There were 4 652 procurement of services, which were worth around 5 400 million euros. 3 057 of the procurement were EU-procurement contract notices worth over 6 801 million euros. (Hankintailmoitusten tilastot, 2017).

From the numbers above, we can see that a lot of money is used to the public procurement every year, and therefore, by optimizing it, a lot of savings can be made. The physiotherapy services of Kela are financed by tax revenue and in the case of municipalities, consumers pay part of the cost and the rest is covered with tax revenue as well. Hence, it is useful to study the procurement systems and to see if procurement rules can be improved.

I start the thesis by introducing earlier studies on public procurement and freedom of choice and present the most important theory lessons. In the second chapter, I tell more about the empirical design and how the research is done. Chapter three continues with the institutional setting. The public procurement design of Kela and municipalities are presented and differences and similarities between them are reported. In chapter four I describe the data of Kela and municipalities and compare them to each other. Chapter five contains the regression results and I conclude in the chapter six.

1.1 Related Literature

Usually, when purchasing a product or a service people are interested in also other features than just the price. The same applies with procurement. Often the procurer wants to get the best quality and, for example, minimize the time used in production. (Asker & Cantillon, 2008).

The public procurement process starts by procurer identifying its needs and designing the process. The procurer has to select the design and the scoring rule that it will use and how it is going to select the supplier. Then after the offers have been placed, the procurer evaluates bids and when the product or service has been produced, it still audits that the service or product is of the promised quality. (Bergman & Lundberg, 2013).

In the optimal procurement, the procurer would have the same information as the providers, the prices would be minimized and the quality would be maximized. In other words, the procurer's expected utility would be maximized. To achieve this goal, competition, low transaction costs and a lack of corruption and favoritism, are needed. (Bergman & Lundberg, 2013). However, it is not possible to have a mechanism that would satisfy all these requirements, at least not in a way that would be simple enough to implement. Therefore second best mechanism is needed. (Asker & Cantillon, 2010).

When implementing procurement request-for-quotes (RFQ) and negotiations are used. In RFQ, minimum quality constraints are set for the procured product or service. The providers have to fulfill these constraints and the offers, which satisfy these are then compared based on the price only. In negotiations, there are couple of service providers with whom the contracts are negotiated. Third option in procurement is to combine negotiations and the RFQ. Different kinds of combinations are menu auctions, beauty

contests and scoring auctions. (Asker & Cantillon, 2008).

In the menu auction, the suppliers can submit different offers for different quality products or services and the procurer then chooses the combination that best suits their needs. In the beauty contest, the procurer announces its interest in different quality factors and it might set different weights for them. Then, the procurer asks only for one offer per product and makes the decision based on the price and the quality. (Asker & Cantillon, 2008).

In the scoring auction, a scoring rule is defined and different offers are ranked according to it. The bidder with the highest score, which is counted according to the scoring rule, is selected to produce the service or product. Different scoring rules are for example a first-score scoring auction and a second-score scoring auction. In former, the provider must produce the product or service, that has the quality demanded, with the price it bid, and in latter, with the second highest bid price. (Asker & Cantillon, 2010).

Public procurement and these different designs of it have been widely studied. Plenty of research have been done of different procurement designs and of suitability of the designs on different cases.

For example, Asker and Cantillon (2008) study procurement taking price and quality factors into account. They start by defining a purely theoretical, optimal procurement mechanism and continue by comparing practical mechanisms to the optimal one. They find that scoring auctions are performing well and therefore encourage the use of them.

Hyytinen, Lundberg and Toivanen (2015) compare different types of public procurement and their performances by using Swedish public procurement data of cleaning services. They conclude that the better the transparency, the more there is entry and the lower are

the costs. Therefore they also suggest the use of scoring auctions and price only auctions as these fulfill the given criteria the best.

Lewis and Bajari (2011) study, which procurement design should be used, when the procured good should be delivered as soon as possible to maximize the social welfare. They use data of California Department of Transportation's highway projects from 2003 to 2008. They compare different contracts that differ from each other only by the procurement design and find that the contracts were completed 30 to 40 per cents faster when scoring auctions were used.

Asker and Cantillon (2008) concentrate only on scoring auctions in their research. Their study differs from the others thus that provider's private information of its cost is multidimensional. They define the equilibrium behavior in scoring auctions and compare scoring auctions to other designs. In addition to the others, they also conclude that scoring auctions outperform the other designs.

Baltrunaite (2018) takes a look at Lithuanian data of government tenders, corporate donors and firm characteristics to study whether political contributions of firms have an impact on procurement contracts. There was a law set in Lithuania in 2012 that forbid companies to donate to political campaigns. Baltrunaite analyzes bidding behaviors of firms and their probability of winning before and after the new law. She finds out that companies that have donated to political campaigns were privileged in procurement before the reform.

Bajari, McMillan and Tadelis (2008) research the use of competitive bidding and compare it to negotiating. They have data of contracts of building construction industry in Northern California from 1995 to 2001. Bajari et al. do a descriptive analysis based on the data and find that more complex projects are more often negotiated. They also

notice that the more there are potential bidders, the better it is to held an auction and that the most experienced and largest companies often get the contracts when negotiations are held.

In the 21st century, the European Union allowed the use of both lowest cost and best economic value as the award criteria. If the best economic value is used, the procurer has to tell the weights it has set to each criterion before the auction. (Asker & Cantillon, 2008).

The best economic value means, that the offer, with the highest quality for a presented price or the offer with the highest score, that is counted from the price and quality, is selected. In this type, the price and quality needs to be measured as the same type, hence the prices need to be changed into points or the quality needs to be measured in euros. It is better to change the quality into prices since then there are no additional weighting needed. (Bergman & Lundberg, 2013).

According to Bergman and Lundberg (2013), if both price and quality are used when choosing a supplier, it can increase the performance of public procurement, even though it also makes the procurement more complex. In fact, in the EU, more common practice in public procurement is to use the total score of price and quality combination than choosing only the lowest price (Bergman & Lundberg, 2013).

Bidding auctions are often easy and efficient to implement. If the auctions are designed well, they manage to maximize profits even with incomplete information. (Manelli & Vincent, 1992). The incomplete information arises when the procurer needs to purchase a product or a service, which quality the procurer has defined, from a supplier that has private information about the costs of producing the product or service (Asker & Cantillon, 2010). As a good auction encourages the bidders to offer a price as close to

costs as possible, the providers reveal some of this private information to the procurer.

The goal of the procurer is to purchase the product or service, which price is the lowest taking into account the quality that needs to be sufficiently good. On the other hand, if there is much uncertainty about the quality of the procured good or service, negotiations are a better choice. Often service with better quality is more costly than a service with bad quality. Hence, if a bidder with the lowest bid is selected, then it is highly possible that the service is of a worse quality. (Manelli & Vincent, 1992)

According to also Bajari et al. (2003), bidding auction is a better choice for a simple good or service and negotiations should be used with more complex goods. More complex projects need more discussion when designing the final product. In negotiations, there are discussions held separately with every service provider that has participated in the procurement. Negotiations increase the flexibility of the design of the product or service as every aspect of it can be clearly bargained and written in a contract. (Asker & Cantillon, 2010).

In bidding auction, there is not much communication between the procurer and bidders before the selection of the service provider. There is a high probability that if the lowest bidder for a complex good is selected, there are some adjustments needed later on and the costs might increase significantly. The benefits of a bidding auction increase with the number of bidders as the increased competition decreases the prices. (Bajari et al., 2003).

Jääskeläinen and Tukiainen (2019) studied the attributes of public procurement using Finnish data. They find that there is not much competition in the Finnish public procurement auctions and the median number of bidders is only two. Thus, in more than half of the procurement there must be only one or two bidders. They also noticed that as the number of bidders increases, the bids on average decrease. However, with six

ore more bidders this effect vanishes. (Jääskeläinen & Tukiainen (2019)).

Asker and Cantillon (2006) argue that the buyer's expected utility of scoring auctions is higher than in the price only auctions and beauty contests. They also say that scoring auctions perform better than menu auctions when a second-price or an ascending format is used as the scoring rule. Also Bergman and Lundberg (2013) conclude in their research that beauty contests, price-only auctions and menu auctions perform worse than the scoring auctions. In fact, Asker and Cantillon (2008) find that the second best mechanism is the scoring auction, at least, when the procurement is not too complex.

1.2 Freedom of Choice in Healthcare Services

With the reform of health and social care there has been a lot of discussion whether the patients' freedom of choice should be increased. The freedom of choice means that patient's can choose, which service provider they want.

The freedom of choice has been used in basic health care market in Sweden from 2010 onward, and it is prescribed by law. However, there is not one specific model on how to implement it, but the municipalities can choose, how the freedom of choice is realized. Even though the law only extends to the basic health care, there are still some municipalities that use it in special health care as well. (Ahonen et al., 2015)

There are many similarities between Sweden and Finland as they are both welfare states and therefore Finland can learn from the Swedish model and the results of it. In addition in both Sweden and Finland, the health care is mainly funded by tax revenue.

The purpose of Swedish model of freedom of choice is to increase competition in health care

market and productivity of service providers, as patients can choose the service provider with the best quality. The patients can also change the service provider whenever they want. If someone does not want to select the service provider themselves, they are provided with one. (Ahonen et al., 2015)

The freedom of choice is also meant to decrease the waiting times, make it easier to get treatment and increase the power of patients. Savings were not targeted with the reform but it is enough to keep the costs at the same level as earlier. (Ahonen et al., 2015)

In Sweden they noticed that the effects of introducing the freedom of choice varied between different municipalities. However, they state that the number of service providers has increased and there are more services available. The quality of services has remained about the same and the people appreciate that they have the possibility to choose themselves. (Ahonen et al., 2015)

There have also been some negative effects. The service providers do not spread equally between different regions and different groups. There are more competition in regions with higher population as there are more potential patients. The number of service providers has also increased in regions with higher incomes. (Ahonen et al., 2015)

Karsio (2019) finds also that the freedom of choice in Sweden increased the well-being of customers, the customers feel more like they are masters of their own lives and it enhanced the quality of life of some customers.

Even though the freedom of choice of patients might increase the prices, it might also be justifiable. According to Pekola et al. (2016), the purpose of offering the freedom of choice is to increase competition between service providers and to improve the quality of services.

Pekola and Pitkänen (2016) surveyed thoughts of customers that had the freedom of choice. They found that the specialty of the doctor, patient's own understanding of the quality and earlier experiences were the base for decision making. When the service in question is offered by Kela, the information about the service is provided by Kela, friends, family and professionals. 90 per cent of people answering the survey say that it is important for them to get to choose the service provider they like.

Usually customers are not active in decision making. They often choose the nearest service provider, let professionals make the decision for them or go to same service provider that they have visited before. Younger people and people with higher education make active decisions more often than older people and people with lower education. (Pekola & Pitkänen, 2016).

I believe, that it is wise to leave decision making about the service provider to the professionals as they have more information available. Therefore patients can get the best treatment that is offered. However, the professionals could have wrong reasons when recommending a provider.

2 Empirical Design

To estimate the effects of the contracting entity on the results of a procurement, I first compare the different data sets and report their similarities and differences. After that, I use an identification based on observables method and, more closely, I rely on the ordinary least squares (OLS) model.

The data consists of 22 557 offers of which 1 828 are from procurement of Municipalities

and 20 729 are from procurement of Kela. The dependent variable in my regression model is offered price per minute in euros and there are multiple control variables. I am using 6 different dummy variables and, in addition, I control the year, when the procurement was held and the duration of the service procured. The years vary from 2006 to 2017 and the different duration are 45, 60 and 90 minutes.

The dummy variables used are "Kela", which gets a value of 1 when the procurement in question is organized by Kela and 0 when it is organized by municipalities. Variable "Group" indicates whether the service is meant for groups or individuals, "Home visit" whether the service is organized at patient's home or in service provider's premises, "Occupational" whether the service is a part of occupational healthcare, "Veteran" whether the service is meant for veterans. In addition, there is a dummy variable for every region. The regions are Southern, Central, Western, Eastern and Northern Finland.

In the regression data, I have all the offers of Kela between 20 and 300 euros. The offers outside these limits are left out from the analysis since according to Kela's researcher they are test offers. From the offers of municipalities I left out invalid offers that had not fulfilled the minimum criteria, because I think that they are not comparable with other offers. For example, one of the offers was marked invalid as the service provider had previously escaped its responsibility to pay taxes or social security contributions. Therefore that service provider could offer lower prices if it was still avoiding these payments.

3 Institutional Setting

Public procurement is a procurement of some good or service purchased outside procurer's own organization by a contracting entity. Authorities of the government, municipalities

and federations of municipalities, statutory corporations and other procurement units, that are defined in the procurement legislation, are different contracting entities that can implement a public procurement. (Act on Public and Concession Contracts, 1397/2016).

The national procurement legislation and the procurement directives of European Union regulate the public procurement. The national legislation is adapted in service procurement worth over 60 000 euros and the directives of European Union are applied on service procurement that is worth over 207 000 euros. (Act on Public and Concession Contracts, 1397/2016).

There are three kinds of procurement; small procurement, national procurement and EU-procurement. Small procurement is a procurement with a value that does not exceed the national or EU thresholds and therefore they are not subject to the procurement legislation. In other words, it is not obligatory to report small procurement on HILMA (hankintailmoitukset.fi).

HILMA is a public and free internet platform where contracting entities give information about their public procurement and companies can find all the on-going procurement and information on the upcoming procurement. The website is maintained by the Ministry of Economic Affairs and Employment of Finland. In my thesis I consider the EU-procurement of municipalities and Kela, which must both follow the procurement legislation and report their procurement on HILMA.

Procurement is used to find out a price for a unique good or service for which the price is otherwise hard to determine, and the producer costs are unknown. The goal of public procurement is to optimize the use of public funds and therefore either the lowest or the most economically advantageous bid has to be chosen. The most economically advantageous bid means the bid, which has the lowest price quality ration. (Ministry of

Economic Affairs and Employment of Finland).

I am studying the public procurement of physiotherapy services. In Finland, physiotherapy can be organized in three different ways: by the public health care, as a part of occupational health care or from a private firm. The patient has to pay some small amount for the service of the public health care. Occupational health care is usually free and for the service of private sector, the patient gets only some subsidies. (Pekola, 2016).

3.0.1 Calls for Tenders of Services

A call for tender is a written announcement of a procurement of a good or service. In the call for tender the contracting entity notifies the period within which the bids have to be submitted. There is not much legislation for the call for tender. In fact, the only requirement is that it must be in written form. (hankinnat.fi, read 4.3.2019).

Usually the call for tender includes a description of the service procured, criteria and minimum quality constraints for the service, period when the service is needed, how the service producers are selected and the period of validity of the bids. (hankinnat.fi, read 4.3.2019).

The service procured is divided into 3 categories. The first one is the name of the procurement, which is the widest category. The name could be, for example, Medicinal rehabilitation services. One procurement can only have one name. The second widest one is the group of services. The group of services is under the name of the procurement and there can be one or multiple groups. In this example, the group could be physiotherapy. The third category includes the actual service for which the bids are given and it belongs to the group of services. There can be several services inside one group of services. Here

the service could be 45 minutes long individual therapy in service provider's premises. The service is the most specific one of the three categories.

3.0.2 Minimum Quality Constraints and Criteria

Minimum quality constraints and criteria are both described in calls for tender and they are an important part of a procurement. Bidders have to fulfill all the minimum quality constraints to get their bids accepted. If some quality factor does not meet the requirements, the bidder is automatically rejected from the auction. These minimum quality constraints are not included in the data I have. Therefore I approached municipalities that had had a procurement and asked about the minimum quality constraints they had.

I have different calls for tenders from 14 municipalities or federations of municipalities and from Kela. Some of the calls for tenders include several services of physiotherapy and some include only one. The calls for tenders contain also the minimum quality constraints. When studying these constraints, I found that usually in physiotherapy services the minimum quality constraints include similar demands and based on the constraints I find that the services, procured by municipalities and Kela, are similar enough to compare the bid prices.

In all of the minimum quality constraints of the calls for tenders, the bidders are restricted by the Act on the Contractor's Obligations and Liability when Work is Contracted Out ("Tilaajavastuulaki"). The purpose of this law is to make sure that the competition between companies is equal, the companies follow the collective agreements and companies can be certain that their subcontractor is also fulfilling the statutory obligations. (Tilaajavastuulaki 2006/1233). In addition, other authoritative certificates, authorizations and registry information are required and the personnel must have some earlier work experience,

usually 2 to 3 years, as well as proper educational background. In many calls for tenders, service in Finnish is obligatory. However, there is also some demand for Swedish services.

The criteria, on the other hand, is not obligatory to fulfill, but when the most economically advantageous tender is selected, the bidder that has succeeded the best in these, gets the highest points. When comparing the criteria of municipalities and Kela, I noticed that they are also alike. This allows me to compare the bid prices without controlling the criteria or the minimum quality constraints.

In the criteria, it is usually desired that the bid price does not include the value added tax, the price includes all the costs and the service is easily accessible. In some of the calls for tenders, the education and the work experience of the personnel were added to the criteria and in some they were included in the minimum quality constraints. This is not a big concern, since it probably does not have big effect on the prices whether they are described in the minimum quality constraints or in the criteria.

3.1 Public Procurement of Physiotherapy Services of Kela

Kela is a Finnish institution that takes care of the basic social security of those living in Finland. Everyone, belonging to the Finnish social security, is a customer of Kela (kela.fi, read: 24.11.2018). It is the biggest organizer of rehabilitation and also the most significant financier of rehabilitation in Finland (Pekola & Pitkänen, 2016). Kela procures more than 100 goods and services every year by using mostly competitive tendering and following the legislation of public procurement (kela.fi, read: 24.11.2018). In 2015, Kela spent 445 million euros for rehabilitation for more than 112 000 people. The share of intensive medical rehabilitation was 182 million euros. (Pekola & Pitkänen, 2016).

Intensive medical rehabilitation services are one of the services that Kela procures. The procurement is held every four years. These services include physiotherapy, music therapy, neuropsychological rehabilitation, psychotherapy, speech therapy, occupational therapy, multiform group therapy and open-care rehabilitation. Of these, I concentrate on physiotherapy, which consists of aquatic therapy, lymph drainage therapy and riding therapy, which are still divided into individual and group therapy. (Kela, 2017). However, I will leave other than basic physiotherapy for individuals and groups out from the analysis to keep the services of municipalities and Kela as similar as possible.

Kela has defined that the objective of the intensive medical rehabilitation services is to improve and maintain the physical, mental and social performance of its customers. Kela monitors the quality of the services by doing audits and following different indicators, which point out the changes in consumers' quality of life, performance, working ability and symptoms as well as achieving the goal that they had set before starting the treatment. (Kela, 2017).

The physiotherapy services of Kela are offered to customers over 65 years old, customers that are disabled to perform tasks of ordinary life, customers, whose need for rehabilitation lasts at least for a year, customers, whose rehabilitation is not associated with medical treatment and customers who need the rehabilitation to support their performance (Kela, 2017).

Kela modified their procurement of physiotherapy after suggestions by working group of Aalto University's Department of Economics. This new procurement was held in 2018 and it is not considered in my thesis as it is not comparable with the earlier procurement. I am describing here the method of the procurement held before 2018, which are present in my study.

The procurement process, which is pictured in figure 1, starts by Kela designing a standard for the intensive medical rehabilitation. The standard defines the content, structure, personnel and the quality requirements of the therapy services. These are the minimum quality constraints that need to be filled to get accepted as a service provider. The procurement is regional, and it is implemented by different number of insurance districts ("vakuutuspiirit") of Kela. (Kela, 2017). In 2006, there were 59 insurance districts, in 2010 29 and in 2014 25. I have divided the procurement into 5 different districts according to Kela's current information of the districts . These districts are Southern, Central, Western, Eastern and Northern Finland (kela.fi, read 4.3.2019).

Procurement of Kela is open for everyone and organized on HILMA. Kela asks service providers to bid for rehabilitation of 45 minutes that is organized in the premises of the service provider. (Kela, 2017). From now on, I will call this price the base price. From the base price, Kela derives prices for 60 and 90 minutes long physiotherapy and physiotherapy that is held at customer's home.

Prices for the different duration are counted linearly, which means that the price of 60 minutes long physiotherapy is 1.33 times the base price and, similarly, price of 90 minutes long physiotherapy is two times the base price. The price for home visits is based on the distance. If the back and forth distance is less than 36 kilometers, the price is 1.5 times the base price, if the distance is 36 to 70 kilometers, the price is 1.7 times the base price, and if the distance more than 70 kilometers, the price is twice as much as the base price. (Economics' Working Group of Aalto University, 2018). Kela determines that the bid price must include the work of pre-preparation, recording, finishing and feedback collected from the customer at least once a year (Kela, 2017).

There are some requirements for the physiotherapist and for the service, in the criteria

that Kela has defined. The therapist has to have completed the studies of physiotherapist and have a permission from the National Supervisory Authority for Welfare and Health ("Valvira") to exercise their profession as a legitimate professional. The therapist needs to also have completed a course of first aid. The rehabilitation premises have to be clean, safe, spacious and accessible and they must be suitable for customers of intensive medical rehabilitation. (Kela, 2017).

Before the auction, Kela estimates the number of customers and based on the estimate, the number of service providers is decided. However, in previous years, almost all of the service providers' offers have been accepted which could have lowered the incentives to bid lower prices. The service producers, whose bids are accepted, get to Kela's list of service producers. The procurement does not oblige Kela to buy the accepted services but it pays only for the realized services. (Kela, 2017).

Kela has officially offered its customers the freedom of choice in the physiotherapy services from 2011 but even before the customers had an impact on the choice (Pekola & Pitkänen, 2016). The freedom of choice means that Kela's customers can choose freely the service producers they desire from the list of accepted service providers (Kela, 2017). The only restriction is that the service provider should operate near the customer, since Kela is reimbursing the cost of travel when the travel is necessary and the cost is reasonable (Pekola & Pitkänen, 2016). Therefore, the winner of the auction cannot be certain to get any customers and it might be that the highest bidder gets more customers than the lowest. This leads to a situation, where there are not many incentives to bid as close to the production costs as possible.

Customers of Kela do not need to consider the price when making their decisions about the service provider as Kela reimburses all the costs. Therefore customers can choose

the service provider based on the observed quality. This could lead to service providers competing with quality. This is important since it is better to buy more expensive services if better results are achieved. However, I think that this can be criticized as it is hard for a non-specialist to tell if physiotherapy is good or not, at least when the differences are not significant. It is possible that the best marketer gets the most customers. Since, in my opinion, the constraints for the services are quite strictly defined already in the standard, the freedom of choice might not be necessary. If violations of the constraints are properly monitored, then all services offered by Kela should be of a good quality and patients can get good care from any of the service providers.

In 2018 Kela modified their procurement design. They lowered the share of quality in decision making from 50 to 20 per cent, which means that the share of price increased from 50 to 80 per cent. This was largely criticized in the media (e.g. yle.fi, hs.fi). Also the number of auctions was decreased from 25 to 5 as Kela's division of Finland changed to Southern, Central, Western, Eastern and Northern Finland.

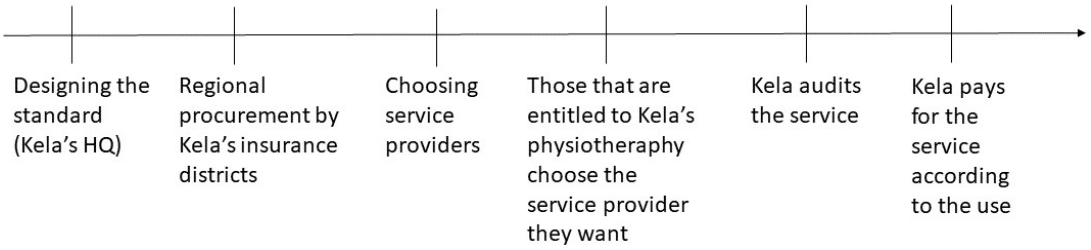


Figure 1: The public procurement procedure of Kela from years 2006, 2010 and 2014

3.2 Public Procurement of Physiotherapy Services of Municipalities

Municipalities are not one unit like Kela and therefore they can all have their own procurement methods. However, comparing the procurement of municipalities, apart

from few small differences, they look quite similar. Like Kela's procurement, also these are open for everyone and organized on the HILMA-website.

Every procurement in my data is an EU-procurement and an open procedure is used. In the open procedure a contracting entity publishes a contract notice and puts the calls for tenders freely available for everyone. Based on this information, the service providers can submit their bids. (hankinnat.fi, read: 4.3.19).

Most of the municipalities use bidding auctions when implementing a procurement. Nevertheless, some ended up negotiating after noticing that there were not enough bidders and better results could be achieved by negotiating. In most of the procurement the bidder with the most economically advantageous tender is selected but there are also procurement, where only price matters. In the procurement with the criterion of the most economically advantageous tender the weight of the quality factors varies from 0 to 50 percent. On average the weight of quality is about 30 percent.

Unlike Kela, the municipalities use a blanket order when allocating customers to the service providers. In the blanket order the priority ordering is determined so that the service provider with the most economically advantageous tender, or with the lowest bid, has the priority for customers. The service is then bought from the best positioned service provider according to its free capacity and the needs of customers. In the same way as Kela, the municipalities are not committed to purchase the services, but they purchase them according to their needs.

Many municipalities offer the service providers a chance to continue their contract for some period of time after the contract period has ended. Usually there is a possibility for two one-year-long option periods without a new bidding auction.

The practices of pricing different duration and home visits varies. Some of the municipalities count the prices same way as Kela and some count the prices with their own methods. However, most of the municipalities ask for separate offers for different duration.

3.3 Comparing Procurement of Physiotherapy of Municipalities and Kela

The services procured are quite similar according to the procurement standards as the minimum quality constraints and the criteria are quite the same. However, most of the service providers do not participate in both the procurement of municipalities and the procurement of Kela.

In the data, I have 1 266 distinct service providers taking part in the procurement of Kela and 431 distinct service providers taking part in the procurement of Municipalities. From these only 20 service providers participated in both. It might be, that since the procurement were organized in different years, the service providers of the market can vary a little because of the usual entries and exits of the market. It could also be that the service providers do not have the capacity to offer services to both Kela and municipalities, and therefore they can only take part in one of the procurement. The service providers that were present in both procurement offered approximately 3.9 cents per minute more in the procurement of Kela than in the procurement of municipalities.

According to a researcher of Kela, the need for rehabilitation of the customers of municipalities might not be as strong as it is to the customers of Kela, as the interest of municipalities is to get the most expensive customers under the treatment of Kela to save money. It is defined by law that Kela must organize physiotherapy for the disabled (Laki Kansaneläkelaitoksen

kuntoutusetuuksista ja kuntoutusrahaetuuksista 15.7.2005/566). This law also guides Kela in organizing the physiotherapy services, which means that municipalities can organize their services more freely.

The biggest difference between the two procurement is the freedom of choice, which is offered to the customers of Kela. This combined with the fact that Kela has been accepting nearly all service providers, lowers the incentives to offer lower prices in the procurement auction of Kela compared to the procurement auctions of municipalities.

In procurement of physiotherapy services both municipalities and Kela use mostly bidding auction, even though there are some cases where a municipality ended up negotiating because of a low number of bidders. It seems that the choice of a bidding auction is justifiable since even though physiotherapy services are quite complex, they have been procured and organized for a long time and therefore the service is now fairly easy to design. In addition, there are many bidders participating in the bidding auctions, which indicates that bidding auctions are more suitable for these procurement than negotiations as they are more cost-efficient.

4 Data

I have data from different sources. The data of procurement auctions of municipalities is offered by Cloudia Oy and the rest of the data is received from Kela. Cloudia Oy is a private company, which purpose is to offer the best digital procurement platform. Public sector entities of Finland are mainly using Cloudia's software and it has a market share of nearly 90 per cent.

Cloudia's database includes data of public procurement auctions organized in Finland between years 2010 and 2017. In my analysis I use information of contracting entities, calls for tenders, target groups, services that are procured, criteria for the services, year when the auction was organized and offers as well as participated and selected service providers. I select only the procurement, which has a municipality or a federation of municipalities as the contracting entity. Unfortunately, the data omits information on the selected service providers and therefore I have less information about those than about other factors of calls for tenders.

I have also data of Kela's procurement of intensive medical rehabilitation services of years 2006, 2010, 2014 and 2018. I will exclude the auction of 2018 from this analysis, as to this auction, Kela changed their practices. Kela's data includes information about the service providers, the regions where they operate, whether the service has some specialty, whether the service is for individuals or for a group, whether it is offered at patient's home or in service provider's premises, the duration, bids and the contract periods.

However, based on expert opinions from Kela, I leave out from the examination the service for groups, other duration than 45 minutes, all the special services and home visits. The reason for this is that the service providers only offer a price for the basic service, from which Kela derives the prices for other types of services.

In addition, I have data on Kela's realized physiotherapy services in 2016, which includes information on payments and realized number of patients on service provider level.

In addition to the data of Cloudia and Kela, I have procurement documents from 14 municipalities and federations of municipalities. Some of the material comprises several procured services and some only one. The most important information of these documents is the minimum quality constraints for the services, which the data of Cloudia lacks.

4.1 Descriptive Statistics

Here I more deeply describe the procurement data I have and compare the differences and similarities between Kela's and municipalities' procurement.

4.1.1 Data of Kela

Tables 1 and 2 describe all the offers that have been registered for Kela's procurement of physiotherapy in 2006, 2010 and 2014. Table 1 shows the offers in euros and in table 2 the offers have been changed to euros per minute. The number of procurement expresses how many insurance districts there have been that year implementing the procurement.

We can see that as years go by the number of insurance districts decreases, which means that Kela has divided municipalities into larger sections. Also the number of offers is decreasing, which could be due to the decreased number of procurement or just a random change over years.

On the other hand, the mean, median, minimum, maximum and standard deviation are increasing in time. Because of the inflation, the prices of physiotherapy services are increasing. According to Statistics Finland, the prices of services of specialist doctors have increased approximately 58 per cent from 2006 to 2014 and the average offer of Kela's procurement has increased around 48 per cent during the same time period. This means that actually the increase in the offers has been quite moderate. In theory, the offers could have increased even more than inflation since the competition has decreased, which can be seen from the lower number of offers. Usually less competition increases prices.

The small standard deviations indicate that most of the offers are quite close to each other. The small gap between means and medians implicates that the distribution is not skewed. If means were much larger than the medians, it would mean that there are some high values that raise the average and skew the distribution, which is not the case here.

Table 1: Descriptive statistics of all offers of Kela's physiotherapy procurement in euros. Number of procurement is the same as the number of Kela's insurance districts as every district implemented their own procurement auction.

Year	# of Procurement	# of Offers	Mean	Median	Min	Max	S.D.
2006	59	1429	38.90	38.90	21.00	71.00	5.79
2010	29	1313	47.02	46.00	28.00	99.00	7.38
2014	25	1266	57.58	57.60	34.00	102.50	9.31

Table 2: Descriptive statistics of all offers of Kela's physiotherapy procurement in euros per minute. The offers are divided by 45 minutes as Kela only asks offers for 45 minutes long physiotherapy services in the procurement and then counts prices for other duration from the offer. Number of procurement is the same as the number of Kela's insurance districts as every district implemented their own procurement auction.

Year	# of Procurement	# of Offers	Mean	Median	Min	Max	S.D.
2006	59	1429	0.88	0.87	0.47	1.58	0.13
2010	29	1313	1.06	1.04	0.62	2.28	0.17
2014	25	1266	1.28	1.28	0.76	2.28	0.21

Table 3 shows information about the realized visits and their payments in 2016, which correspond to the procurement that was held in 2014 as Kela procures services for four years at a time. Unfortunately, I do not have data of the realized services from other years, and therefore we can make only cautious conclusions based on these observations. As said before, Kela is only paying for the realized services.

Physiotherapy of 60 minutes has been the most common choice for patients in 2016 and the difference to other duration is significant. Therefore it is no surprise that in total Kela paid the most for the 60 minutes long services. However, even though Kela pays the same amount per minute for different duration, the realized average minute prices are the lower the longer the service is.

Table 3: Descriptive statistics of realized visits and payments of physiotherapy services in 2016 procured by Kela in 2014.

	45 minutes	60 minutes	90 minutes
Paid on Average	72.41	89.57	116.49
Paid on Average per minute	1.61	1.49	1.29
Number of Visits	115 971	573 138	15 392
Paid altogether	8 529 783.75	53 539 915.57	1 806 765.67

The table 4 and figure 2 are comparing the offers of procurement of 2014 and the realized prices of 2016. In the table 4, the values for the offers are counted from all the offers hence also the offers from service providers that did not get any visits are included. In the values for the realized prices, only the service providers that got patients for a specific

duration are present in the calculations. For the figure 2, I have filtered the offers to the procurement so that I have left out offers with starting date after 2016 and offers with ending date before 2016.

From table 4 we can see that the average offers are quite a lot lower than the realized prices. This could implicate that patients are not choosing the service providers with the lowest offers and therefore Kela might save money if the freedom of choice was removed. Of course, since I do not have information on the capacities of the service providers, the averages might also differ because the service providers with lower offers might have lower capacities than the service providers of higher offers. However, I doubt that only the differences in capacities would cause a difference of this magnitude. The average realized price of 45 minutes is 25.8 per cent higher than the average offered price, of 60 minutes the difference is 16.8 per cent and of 90 minutes it is 0.6 per cent. The longer the duration, the closer the average offer is to the average realized price.

Table 4: Comparison of Kela's procurement auction offers in 2014 and the realized payments in 2016.

Average Price	45 minutes	60 minutes	90 minutes
Offer	57.60	76.61	115.21
Realized	72.47	89.56	115.93

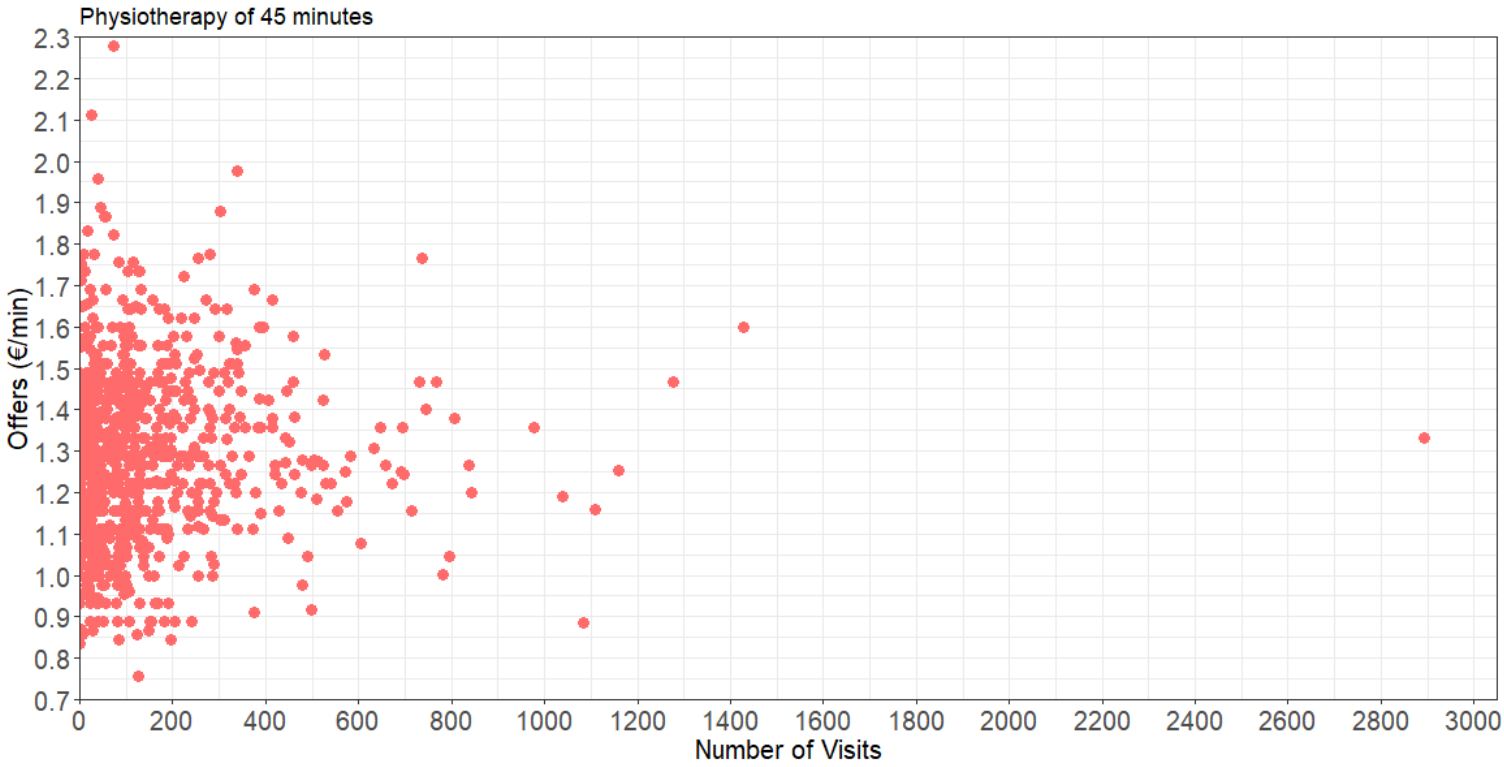
The scatter plots of figure 2 show the relation between offers and realized visits. Only offers by service providers that have got patients are shown in the figures. One dot represents one service provider, y-axis value shows its offer and x-axis value the number

of visits of patients it has got. This means that the more on the right a service provider lies, the more visits it has got and the higher up it lies, the higher the offer has been. For example, the dot on the far right in the plot of services of 45 minutes represents a service provider that has offered to produce the service for 60 euros per visit and it has got 2 893 visits from patients.

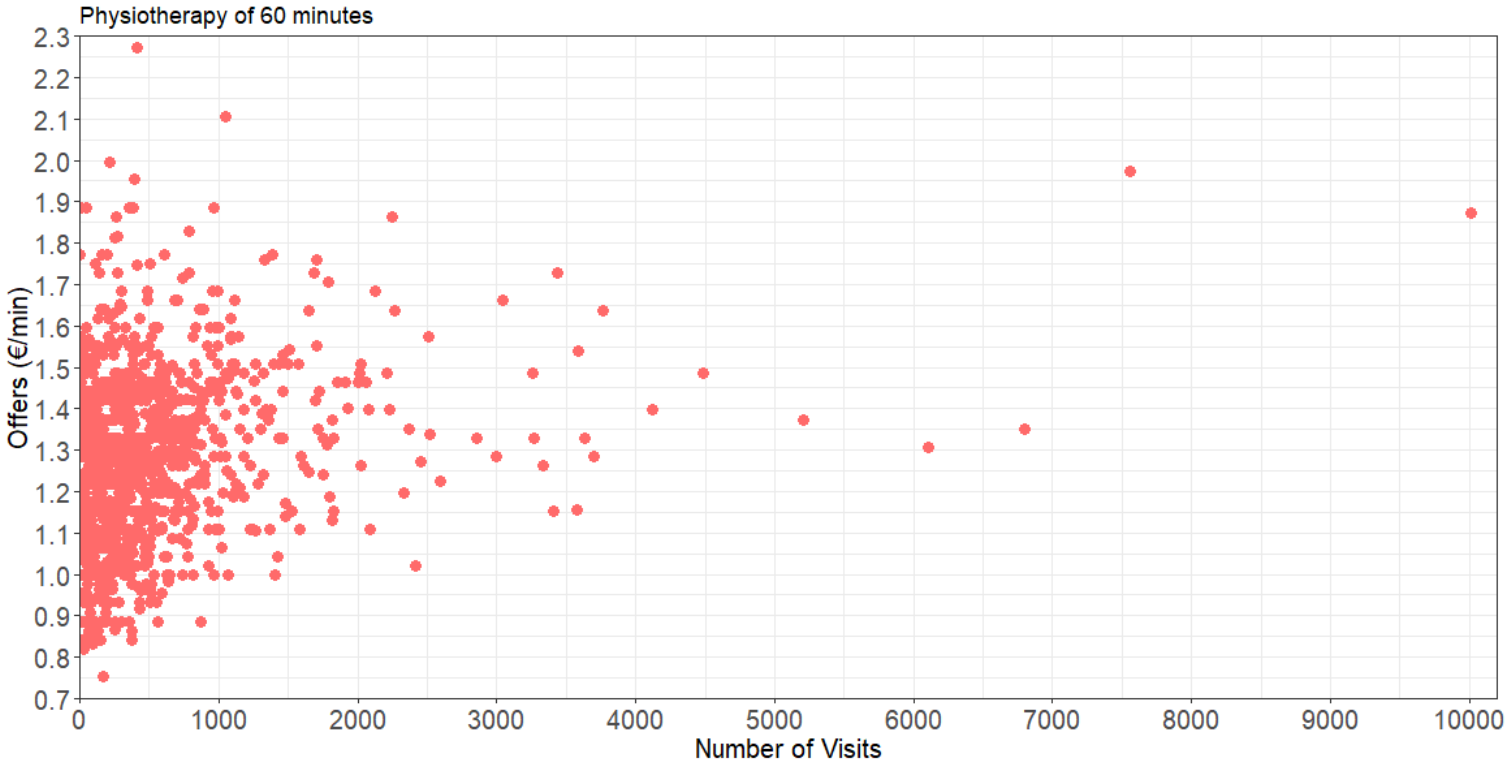
There are different plots for different duration. The offers for 60 and 90 minutes long services have been derived from the offers of 45 minutes long services by multiplying it with 1.33 for the 60 minutes and by two for the 90 minutes long services.

As the plots show, most of the service providers have got only few visits and only few have got many visits. For example, in the 45 minutes long services, only seven service providers have got more than 1 000 visits and 38 have gotten more than 500 visits. In contrast, there are 58 service providers that have got less than 5 visits.

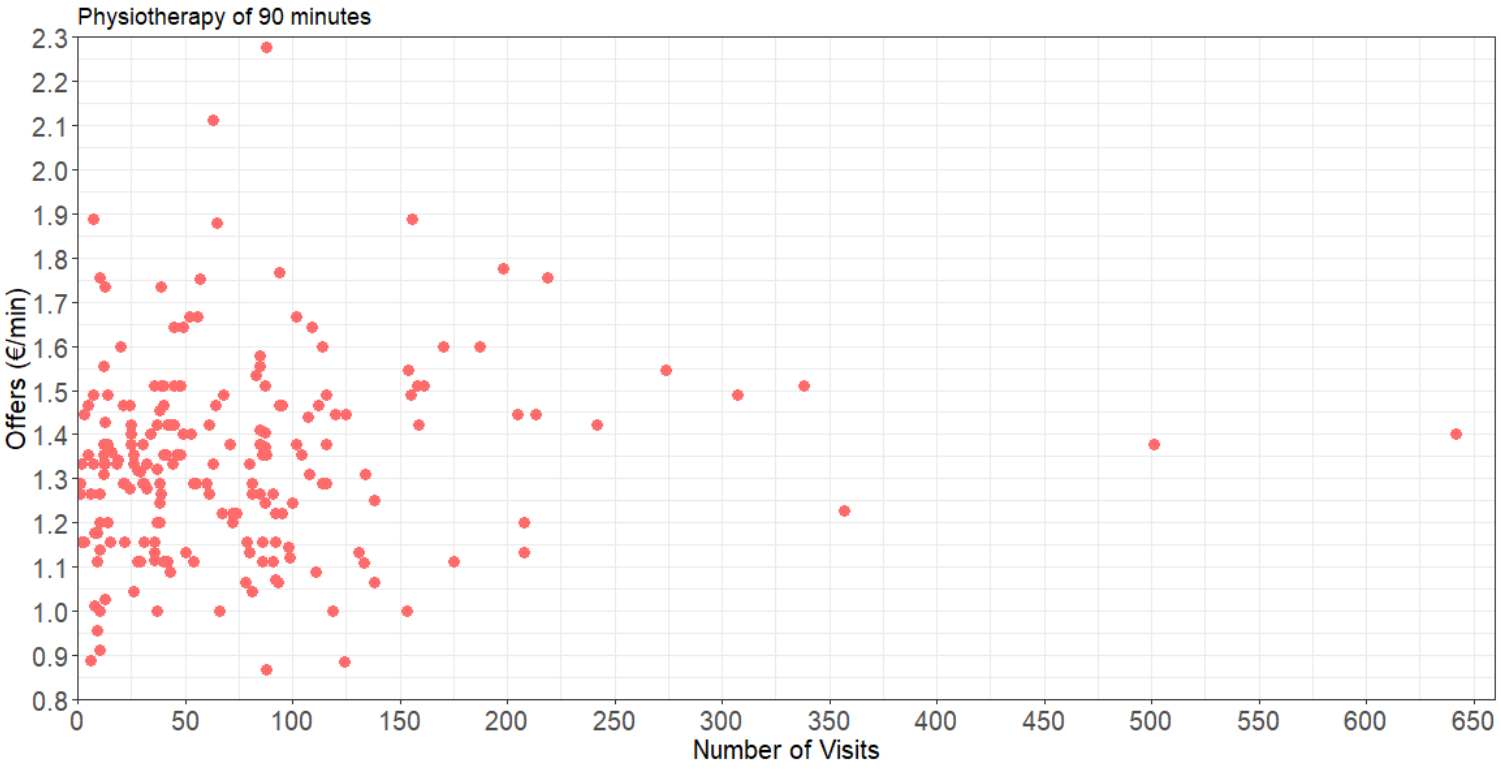
In both 45 and 90 minutes long services the service provider that has got the most visits has offered close to the average offer. However, the visits of 90 minutes long service range only from one to 642, hence the differences in number of visits are not as large in that duration as they are in the service of 45 and 60 minutes. On the other hand, the service provider that got the most 60 minutes visits, offered the 12^{th} most expensive bid of those that got any patients and the 16^{th} most expensive of all the bids. The bid of the service provider, that had the second highest number of customers, was even higher.



(a) Offers of Kela's procurement auction in 2014 and realized visits in 2016 of 45 minutes long physiotherapy.



(b) Offers of Kela's procurement auction in 2014 and realized visits in 2016 of 60 minutes long physiotherapy.



(c) Offers of Kela's procurement auction in 2014 and realized visits in 2016 of 90 minutes long physiotherapy.

Figure 2: Offers of Kela's physiotherapy procurement in 2014 with the visits each service provider has got in 2016 for different duration. The offers are in euros per minutes and can be read from the y-axis and the realized number of visits can be read from the x-axis. The more on the right a service provider lies, the more visits it has got and the higher up it lies, the higher its offer has been. Therefore, the worst scenario is the right top corner as it would mean that an expensive service provider has got a lot of patients.

4.1.2 Data of Municipalities

As mentioned, the data of procurement of municipalities is provided by Cloudia. In the data, one row represents one procurement event where a municipality purchases physiotherapy services. There might be several services procured at the same time or

only one, which means that there can be several bidding auctions. Sometimes it can be ordered that one service provider has to bid for every service, in other words, partial bids might not be accepted. However, in almost all of the procurement, the partial bids were allowed.

From the database, I selected all the procurement where the service contains the word physiotherapy, hence I take a look at only the procurement of physiotherapy. I glanced through the data and removed procurement where the service or product was related to physiotherapy but was not comparable to the services procured by Kela. For example, there were many products procured that are needed in physiotherapy. In addition, I left out all procurement where it was mentioned that it is a test.

I also removed procurement where the prices were asked for one day or for whole year as those offers would have been hard to transform into comparable prices, since I do not know the number of visits it includes. Then, I went through the procurers and kept only those where the procurement unit is a Finnish municipality.

Next I checked where the service is held, if it is meant for veterans, what is the duration, if it is occupational healthcare and if it is meant for groups or individuals and marked these to the data. This procurement data I merged with offers to see which service providers had offered which prices in which procurement. In the end, I still deleted the offers where the service provider was Cloudia or the same as the procurer, as they are most likely test offers.

There are 127 different services procured for which there are 1 806 bids. The minimum amount of bids for one service in a procurement is 1 and the maximum is 89 with the median being 7 and mean being 14.22. Therefore the median is higher than two, so higher than usually in public procurement in Finland according to Jääskeläinen and Tukiainen

(2019). There are six or more bidders in 56.7 per cent of procurement. Hence, the average of the bids would not decrease even if the competition was increased along Jääskeläinen and Tukiainen (2019), who state that increasing competition further after six bidders does not effect the offers anymore.

The price per minute for 45 minutes long services is on average 1.35 euros, for 60 minutes long it is 1.26 euros and for 90 minutes it is 1.20 euros. It can be seen, that the longer the duration, the lower the price. Therefore it is beneficial to ask separately the bids for different duration, as the costs for the service provider seem not to increase linearly with the duration, which is how Kela counts the prices.

Tables 5 and 6 present the descriptive statistics of procurement of municipalities. From the data of offers to the procurement of municipalities I have filtered out all the invalid offers that did not match the minimum quality constraints to make the data more comparable with Kela's offers. Table 5 has the values in euros and table 6 has them in euros per minute.

The second column, in tables 5 and 6, shows the number of calls for tenders each year and the third column tells how many separate services were procured for which the offers were given. For example the call for tender could be for medicinal rehabilitation and the actual service, for which the offers are asked for, could be 45 minutes individual physiotherapy for adults in the service provider's premises.

In all years, the medians are lower than the averages from which we can conclude that there are a couple of higher offers that raise the average. Also the standard deviations are quite high, which means that there is a lot of variation in the offers. The minimum prices stand out from the data as they are offers for a group physiotherapy, where the price is given in euros per persons and the therapy is meant for groups of three to five

persons. The maximum offers, on the other hand, stand out as they are also offers for a group physiotherapy but in this case the price is given in euros per group.

From these tables we cannot see that the offers would be increasing in time. It might be because of the varying numbers of calls for tenders, or because of the moderate amount of data as there are only a couple of procurement per year. Also, we cannot make any conclusions from the amount of competition and the changes in it.

Table 5: Descriptive statistics of all bids of municipalities' physiotherapy procurement in euros.

Year	# of Procurement	# of Services	# of Offers	Mean	Median	Min	Max	S.D.
2012	2	7	115	68.95	60.00	35.00	244.00	33.01
2013	7	29	461	76.51	71.00	15.00	202.50	27.17
2014	6	21	347	74.78	70.00	36.00	158.00	19.41
2015	4	21	93	73.00	75.00	20.00	171.00	27.79
2016	10	31	592	68.11	63.00	10.00	365.63	29.91
2017	7	17	215	73.55	69.00	26.00	150.00	23.72

Table 6: Descriptive statistics of all bids of municipalities' physiotherapy procurement in euros per minute.

Year	# of Procurement	# of Services	# of Offers	Mean	Median	Min	Max	S.D.
2012	2	7	115	1.32	1.19	0.67	5.16	0.63
2013	7	29	461	1.27	1.21	0.25	2.85	0.40
2014	6	21	347	1.30	1.23	0.60	2.63	0.32
2015	4	21	93	1.24	1.20	0.42	2.13	0.41
2016	10	31	592	1.29	1.17	0.17	4.06	0.45
2017	7	17	215	1.33	1.25	0.43	2.50	0.37

4.1.3 Comparison of Data of Kela and Municipalities

In figures 3, 4 and 5 y-axis shows the distribution of bids. In figures 3 and 5, the procurer can be read from the x-axis.

Figure 3a shows the distributions of offers of Kela's and municipalities' procurement and figure 3b shows the distribution of only the year 2014. 2014 has been chosen since it was the only year from which I have data on both Kela and municipalities. The offers have been changed to euros per minute to get them more comparable. This means that the offers of Kela have been divided by 45 as all the offers are for a service of 45 minutes and the offers of municipalities have been divided by 45, 60 or 90 depending on the duration. The plots are only presenting the distributions and therefore frequencies in different groups cannot be seen from the figure.

In figure 3a, the outliers of all the offers of municipalities are the offers for group physiotherapy mentioned earlier. These are the six highest and about ten lowest offers. That is because in the highest offers, the offers are for the whole group and in the lowest offers the prices are given per individual. For this reason the offers of group therapy are left out from the plot on the right side of figure 3a. From this plot, I also left out the home visits to get the offers as comparable as possible. These changes do not have a big impact on the average as it decreases only by 0.09 cents. The impact of procuring a group therapy or home visits on the offers can be well seen from the figure 4. As the figure shows, these services are increasing the offers quite a lot and since Kela's data does not include them, they are best to be left out from the data of municipalities as well.

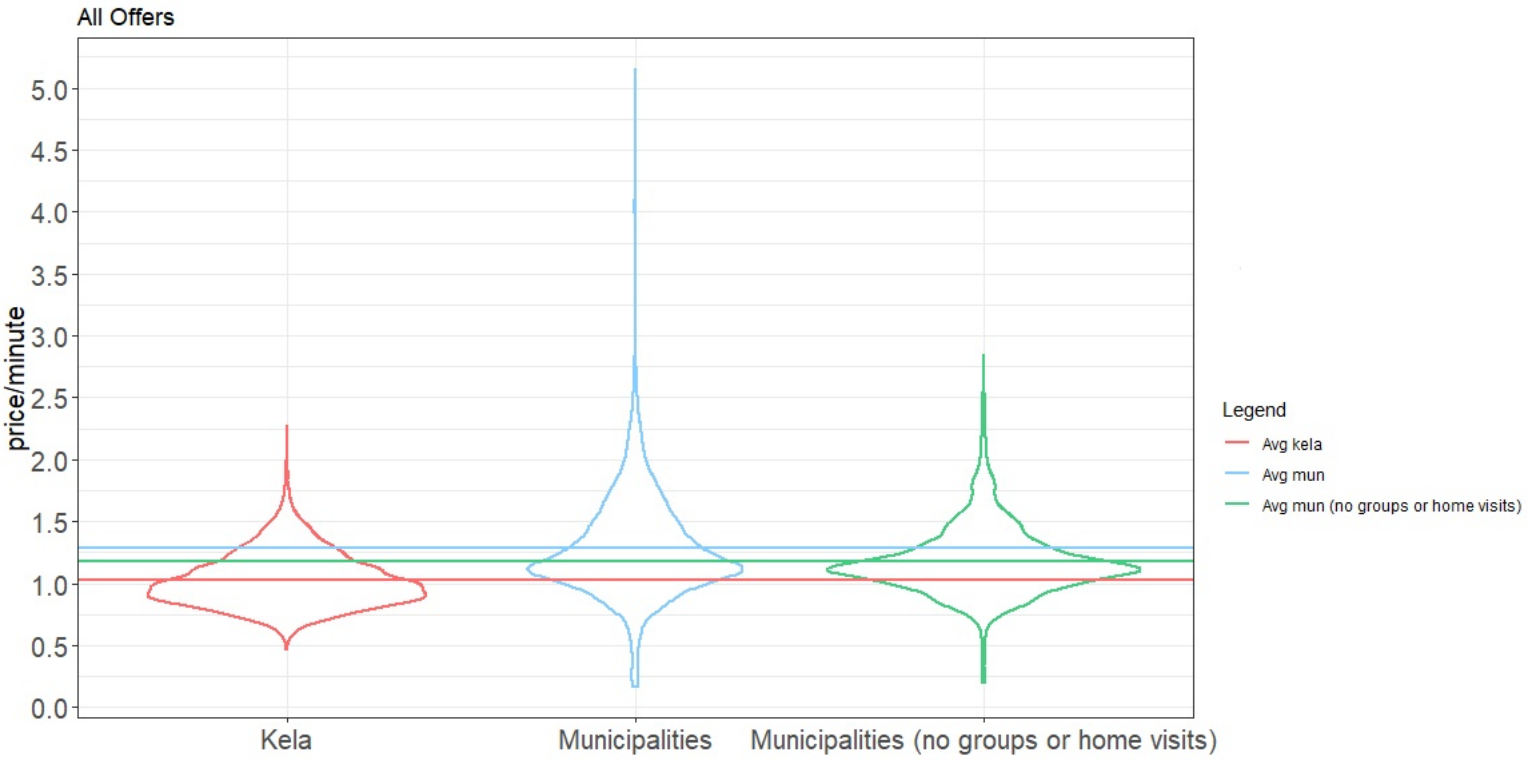
There are remarkably more offers to the procurement of Kela than to the procurement of municipalities, which means that there is more competition in Kela's procurement auction. Because of that one would think that the offers for the procurement of Kela would be lower than for the procurement of municipalities. When comparing the average offers in figure 3a, we can see that this indeed is the case. However, from figure 4 we can notice, how the average offer of Kela has increased in time, which means that it is possible that the average offer of Kela is lower than the average offer of municipalities only because the procurement were held much earlier.

Even when the offers for group therapy have been left out from the data in figure 3a, we can see that the offers of municipalities are both lower and higher than the offers of Kela but the average offer of municipalities is above Kela's. The medians of both plots of municipalities are also higher than Kela's. These might be because of the differences in the years of conduct. Therefore I also viewed only the offers of 2014 in figure 3b.

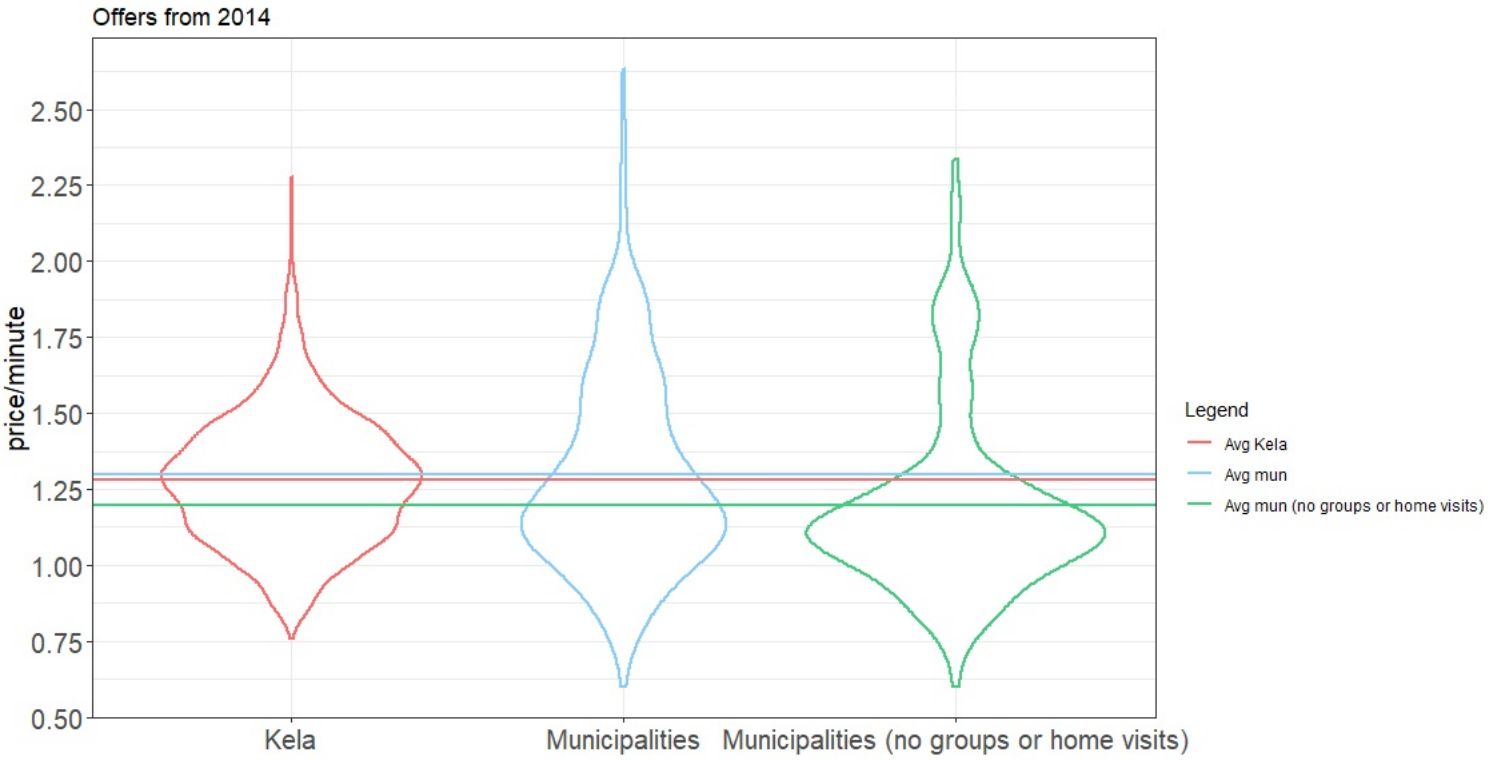
In 2014 there were not any procurement of physiotherapy for a group, which made the

offers more comparable. However, there were home visits that are again removed from the plot on the right side of figure 3b. Now the average offers are closer to each other but still the average offer of Kela is slightly less than the average offer of municipalities with a difference of 0.01 euros. However, the median offer of municipalities is now 0.06 euros per minute less than the median of Kela's offers. As the home visits are removed from the data, the average offer of municipalities drops well below the average offer of Kela.

Yet the biggest difference between these procurement is, that all Kela's offers of these plots have been accepted and the consumers can choose, which service provider they want. On the other hand, municipalities fulfill the capacity of the service provider with the lowest offer first, and after that the service provider with the second lowest offer and so forth. Therefore, in Kela's case the highest bidder with the bid of 2.3 euros per minute could get customers but the highest bidder of municipalities probably does not get any customers. Hence, it is necessary to compare also the offers of selected service providers of municipalities to those of Kela.



(a) The distributions of all offers of Kela's and municipalities' procurement auctions and their averages.



(b) The distributions of offers of Kela's and municipalities' procurement auctions in 2014 and their averages.

Figure 3: Figure shows how offers of Kela's and municipalities' physiotherapy procurement are distributed. The y-axis shows the price per minute and the width represents the share of bids. The areas of the plots are the same size, therefore frequencies in different groups cannot be seen from the figure. On the right hand side, offers of group physiotherapy and home visits have been removed from the municipalities' procurement, as they are not comparable with Kela's procurement and are increasing the average offer of municipalities. The average offers are represented as horizontal lines.

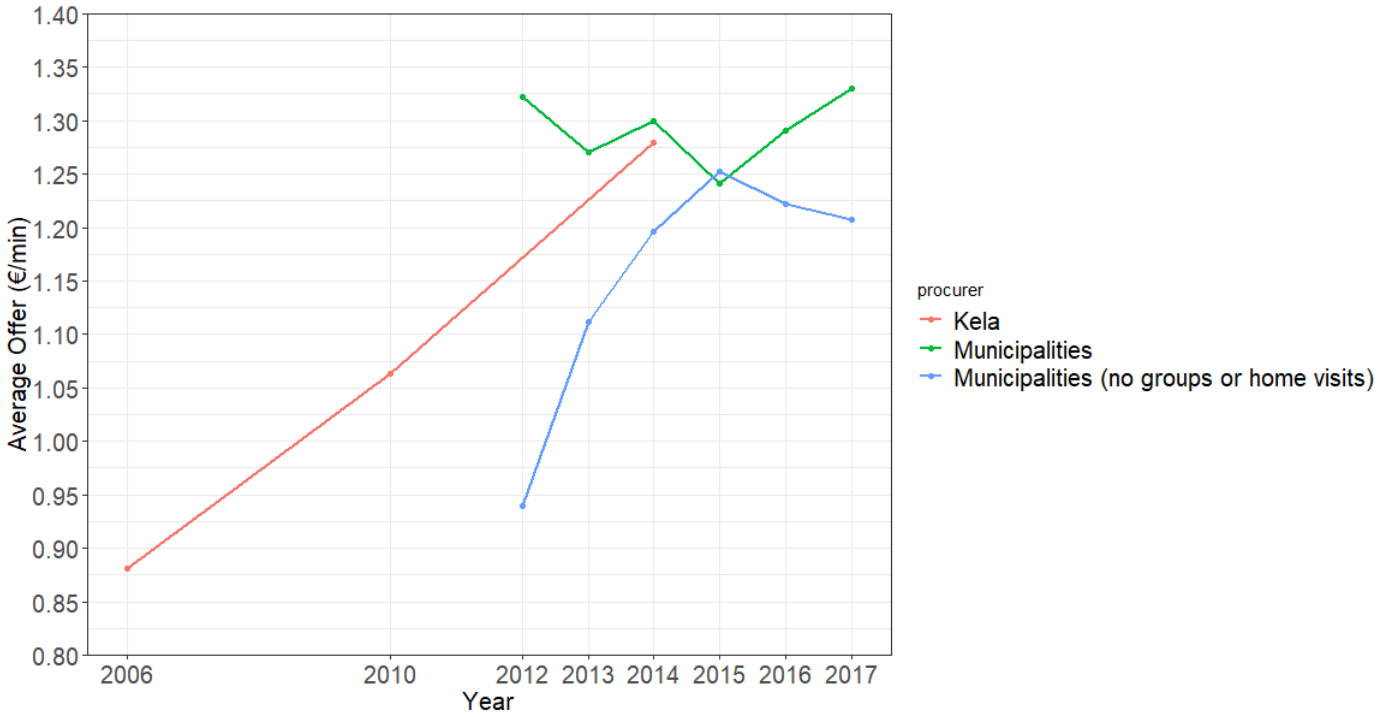


Figure 4: Comparison of the development of Kela's and municipalities' physiotherapy procurement offers in time. The y-axis represents the average price in euros per minute and x-axis shows the year the procurement was held. Offers of group service and home visits have been removed from the blue line to make the data of municipalities more comparable to the data of Kela.

Figures 5a and 5b show violin plots of the selected offers of Kela and municipalities. The third pattern represents the selected offers of municipalities without the group therapy and home visits. The second and third pattern are based on data that I gathered from different files that I got from municipalities. The data set I collected is actually better than the one got from Cloudia's data as it has more selected offers, which is why I leave Cloudia's data out from this comparison. Figure 5b has the same data as 5a but only from 2014. The figures also show the average selected offers as horizontal lines.

In the data of municipalities the challenge is, that the municipalities select almost all the

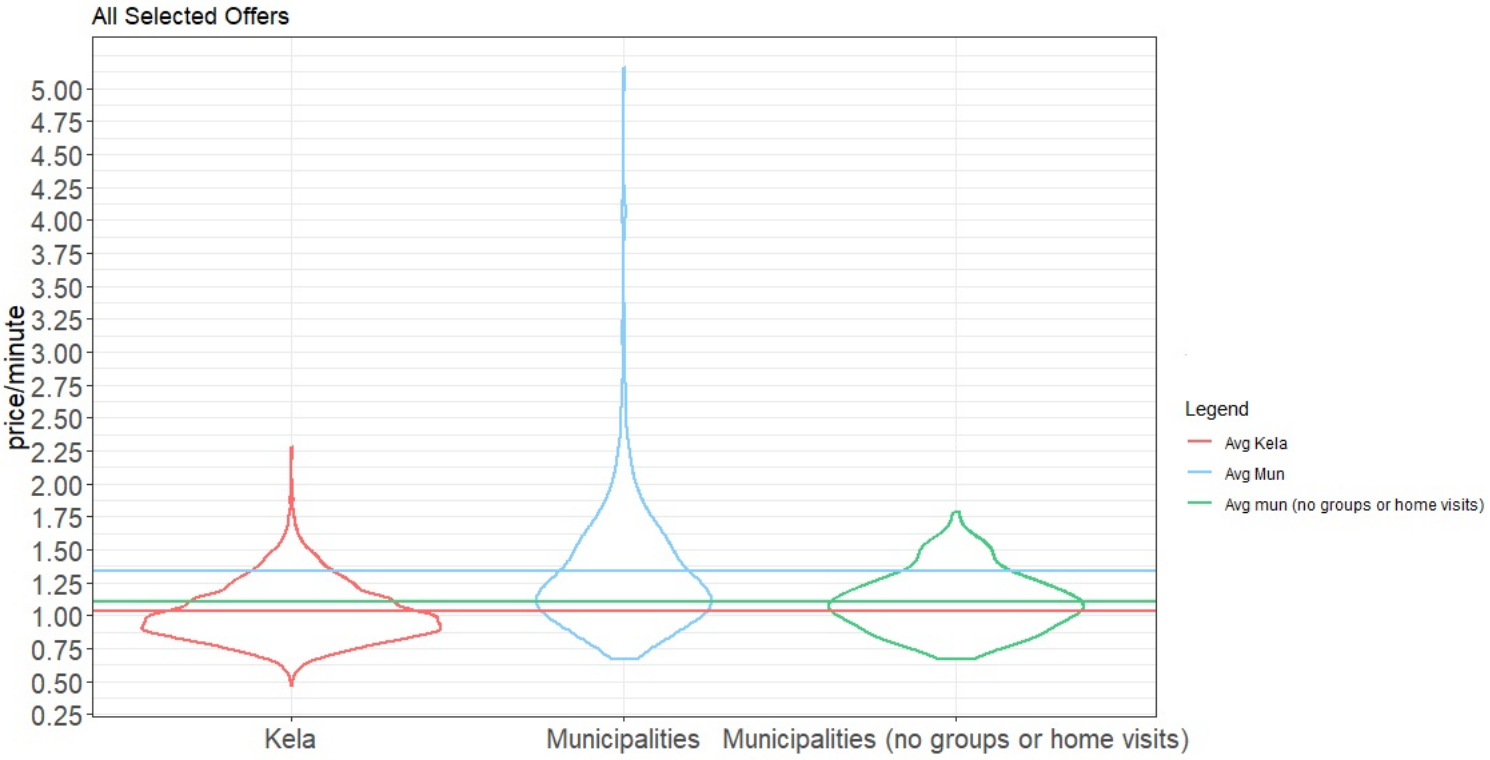
offers like Kela but then they are allocating the patients in order to the service providers with the economically lowest offers. Another challenge is the small amount of data, which makes it questionable to draw general conclusions from the results.

From figure 5a we can see that there are quite high single values in the first plot of municipalities but they all disappear when group physiotherapy and home visits are filtered out. It is justifiable to filter those offers since they are not present in Kela's data either. This brings the average of municipalities close to the average of Kela, Kela's average offer still being slightly lower. Again, the difference might be explained by different time periods.

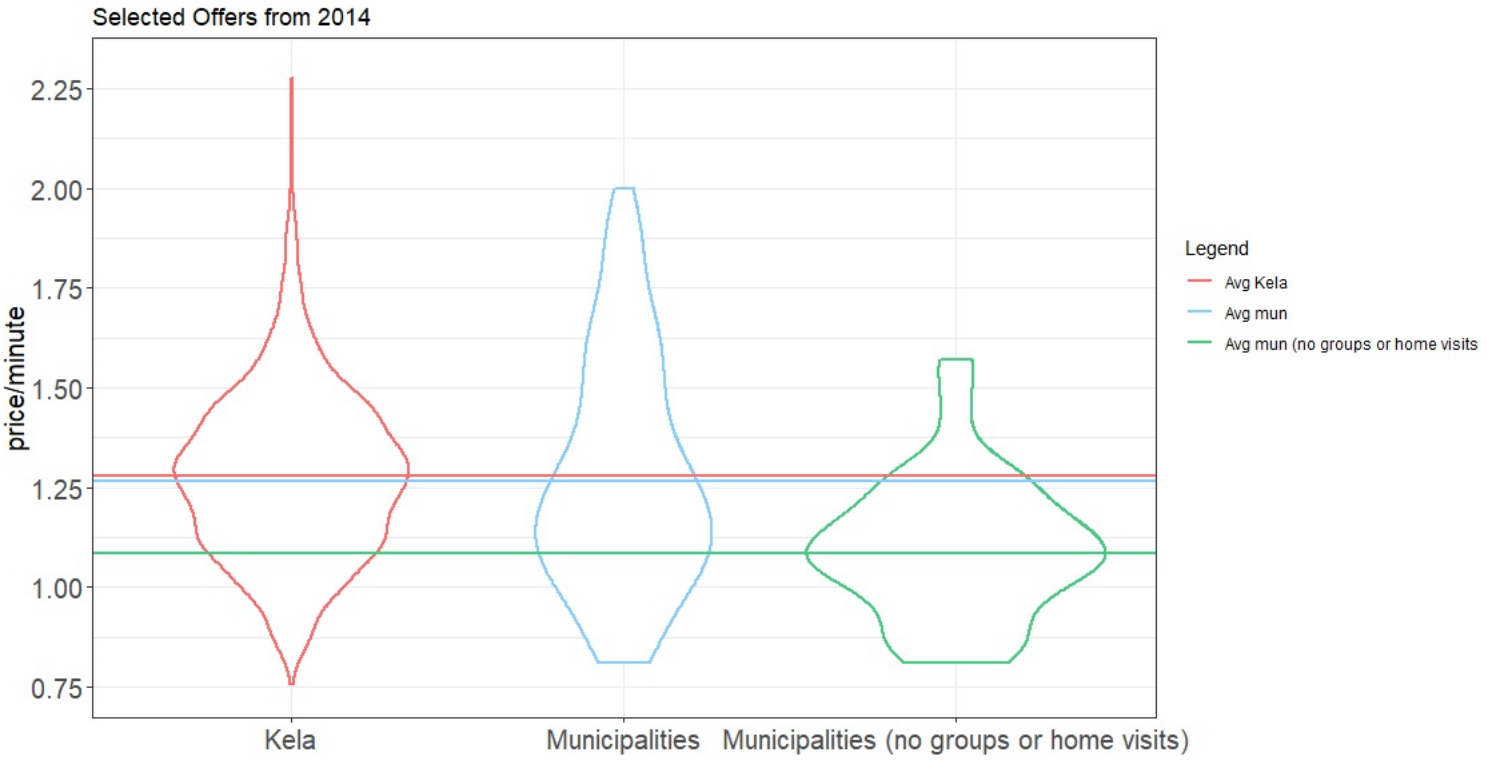
In figure 5b the effect of year has been canceled out as the figure covers only the year 2014. Both averages of municipalities (the average of all selected offers and the average offers without group physiotherapy and home visits) decrease below the average of Kela. Hence, based on the data I have, it looks like service providers selected by municipalities have lower offers than service providers selected by Kela. In addition, in municipalities, the lowest bidder gets the most patients, which means that Kela could save money if they did not offer the freedom of choice. Still, I stress, that the limited data does not guarantee the accuracy of these results.

Figure 6 shows the development of average selected offers in time. The red curve represents all the selected offers of Kela's procurement auctions and the green curve all the selected offers of municipalities' procurement auctions. In addition, the blue and purple curves represent the selected offers of municipalities according to the self collected data with and without group therapy and home visits. We can see that the curves of municipalities are varying a lot depending on the data. However, it seems that the average selected offers of municipalities are lower than those of Kela's when the services are comparable, alias

when group services and home visits are not included.



(a) The distributions of all selected offers of Kela's and municipalities' procurement auctions and their averages.



(b) The distributions of selected offers of Kela's and municipalities' procurement auctions in 2014 and their averages.

Figure 5: Figure shows how selected offers of Kela's and municipalities' physiotherapy procurement are distributed. The y-axis shows the price per minute and the width represents the share of bids. The areas of the three plots are the same size, therefore frequencies in different groups cannot be seen from the figure. Offers of group physiotherapy and home visits have been removed from the rightmost pattern, as they are not comparable with Kela's procurement and are increasing the average offer of municipalities. The average offers are represented as lines. The data of municipalities has been self collected from different files received from municipalities since Cloudia's data of the selected offers is quite limited.

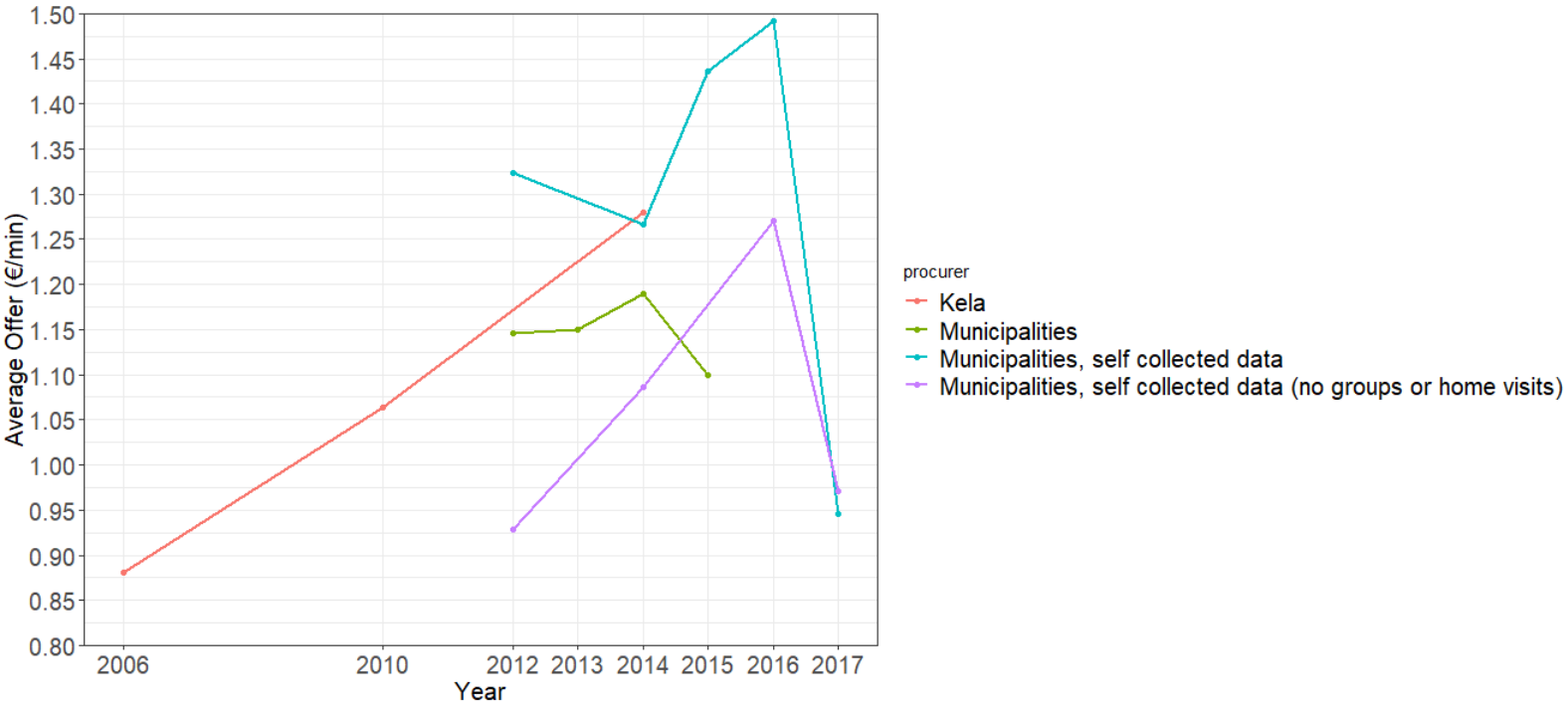


Figure 6: Comparison of selected service providers' offers of Kela's and municipalities' physiotherapy procurement. The prices are in euros per minute and can be read from the y-axis. X-axis shows the year of the procurement. The blue and purple curves represent the data I collected myself from files I received from municipalities as Cloudia's data of the selected service providers is limited.

5 Results

Table 7 describes the distribution of data values used in the regression. Here all the data has been combined, hence it includes both the data of Kela and the data of municipalities.

The lowest offer in euros per minute is 0.17 and the highest is 5.16, which means that the offers are quite widely deviated. However, when examining the offers below the third quartile, we can see that the offers vary only from 0.17 to 1.17, so 75 per cent of the

offers are below or equal to 1.17 euros per minutes. There are only few exceptionally high values that increase the maximum value. When taking a closer look at the values, I noticed that 114 offers are over or equal to two euros per minutes of which 23 are offers of group therapy and only 14 are from Kela's procurement auctions. The rest are probably home visits or other special services.

Table 7: Descriptive statistics of data of linear regression, which includes both, the data of municipalities and the data of Kela. The deviation of data values can be seen from this table.

Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum
0.167	0.874	1.000	1.046	1.170	5.156

Table 8 shows the results of the linear regression with different numbers of independent variables. The regression coefficient for variable "Kela" varies from -0.27 to 0.11. Without controlling the background variables, the coefficient is negative, but once the time variable is included, the coefficient turns positive. Therefore, according to the results, shifting the procurement from municipalities to Kela, increases the price per minute of physiotherapy services. In the 4th column, with all the controls, the coefficient is 0.08 euros. This can be interpreted as effect of Kela on price per minute when nothing else changes. The average offer in the data is 1.05 euros from which 8 cents is about 7.6 per cents, which means that the result is economically quite significant.

Without any control variables, the coefficient of Kela is -0.27. According to this, offers to the procurement of Kela would be actually lower than those to the procurement of municipalities. This is probably because, in my data, almost all of the procurement

auctions of Kela have been held before the procurement auctions of municipalities and, because prices are increasing over time, so are the offers. This can also be seen from table 8 from the coefficient of the variable "Year", which is 0.05. Hence, the effect of year on the price per minute is estimated to be 5 cents per year. In the data, the first procurement of Kela was held in 2006 and the first procurement of municipalities was held in 2012. If the offers increase on average 5 cents every year, it would mean that the offers of Kela in 2006 should be about 30 cents higher than the offers of municipalities in 2012, which is a quite significant difference.

From the table 8, we can also observe that the offers per minute decrease when the duration increases. This can be easily seen from the data. The average of all valid offers per minute of a service of 45 minutes is 1.06, of 60 minutes is 1.05 and of 90 minutes is 1.03 euros. If we are looking only at average offers of municipalities then the average offer for 45 minutes is 1.35 euros per minute, for 60 minutes 1.26 euros and for 90 minutes 1.2 euros. In Kela's case the average offer in euros per minute is the same 1.03 euros for every duration as they count the prices linearly for 60 and 90 minutes long services from the price of the service of 45 minutes. According to the data it would be beneficial to ask different prices for different duration.

The offers of physiotherapy of occupational health care are lower than those of public health care. This might be because in general employed are often healthier than unemployed or pensioners, and maybe therefore the service providers can offer lower prices to the occupational health care.

The regression coefficient of "Group physiotherapy" indicates that the offers of group services are 0.16 euros lower per minute than the offers of service for individuals. The result is statistically significant and 16 cents are 15 per cents from the average offer of

1.05 euros per minute, which means that the result is economically significant as well. It is clear that group service is less expensive than individual service in those procurement, where offers are asked in euros per individual. Most of the procurement were conducted this way. However, the highest offers in the data are offers for group services since in one procurement the offers were asked for the whole group of 3 to 5 persons. Therefore the effect of group therapy might be in fact even more than just 16 cents.

The row of home visit compares the offers in euros per minute of services in patients' homes to services in providers' premises. Logically, if the service is organized at patient's home, it increases the price. The estimated effect in the model is 0.37 euros per minute, which is statistically and economically highly significant.

The coefficients of services for veterans, in the table 8, do not go well with logic. One would think that offers of services for veterans are higher than services for adults but the regression results suggest otherwise. The coefficient for veterans is -0.07 euros per minute. The result is both statistically and economically significant. It could be that there are additional subsidies offered to the physiotherapy for veterans, which lowers the prices.

I also found interesting that the coefficients of Central, Western, Eastern and Northern Finland were negative compared to Southern Finland. They were all statistically significant. I would have thought that in Southern Finland there are more competition and therefore the offers would be lower. It could be that outside Southern Finland it is more important for the service providers to get accepted in the procurement to get any customers and hence they need to offer lower prices. It might be that in Southern Finland individuals go more often to see a physiotherapist even if they had to pay it themselves and therefore the companies can be profitable even without the patients of Kela and municipalities .

Table 8: Linear regression results. The dependent variable is bids in euros per minutes and independent variables are listed on the left hand side. Number of observations is 22 535. These estimates use data on all bid prices, not just winning bids. The standard errors of the estimates are reported in parentheses. ***p<0.001, **p<0.01, *p<0.05, .p<0.1. Adjusted R-squared is 0.454

Dep. var: Bids (euros/minute)	(1)	(2)	(3)	(4)
Kela	1.081e-01*** (6.163e-03)	1.071e-01*** (6.317e-03)	7.990e-02*** (7.335e-03)	8.062e-02*** (7.245e-03)
Year	4.919e-02*** (4.433e-04)	4.919e-02*** (4.433e-04)	4.901e-02*** (4.435e-04)	4.889e-02*** (4.360e-04)
Duration	-1.924e-04** (6.982e-05)	-1.916e-04** (6.984e-05)	-1.828e-04** (6.977e-05)	-2.172e-04** (6.855e-05)
Group	-1.466e-01*** (1.169e-02)	-1.470e-01*** (1.171e-02)	-1.552e-01*** (1.175e-02)	-1.638e-01*** (1.158e-02)
Home visit	3.844e-01*** (1.018e-02)	3.834e-01*** (1.028e-02)	3.947e-01*** (1.038e-02)	3.742e-01*** (1.025e-02)
Occupational		-1.613e-02 (2.248e-02)	-4.227e-02 . (2.274e-02)	-5.772e-02** (2.235e-02)
Veteran			-6.894e-02*** (9.489e-03)	-7.013e-02*** (9.326e-03)
Region				Included

5.1 Regression assumptions

To make sure that the model is working and the results are correct, I performed several checks about the assumptions of linear regression and goodness of the fit of the model.

Adjusted R-squared increases when more independent variables are added. This indicates that all the independent variables used are needed. The last model is therefore the most plausible and I rely on that one when interpreting the results. Checking the variance inflation factors (VIF) of independent variables, revealed that there is no strong multicollinearity between them.

I also checked the relationship between the independent variables and the offers by plotting

the residuals of the model against the fitted values. I also graphically checked the homoscedasticity of the data with the Scale-Location plot. The only minor violation against the regression assumptions occurred when checking the normality of residuals. Namely there were a few exceptionally large residuals, which differ from the normal distribution more than they should.

6 Conclusion

The purpose of this thesis is to study the cost of freedom of choice of patients and the impact of the freedom of choice on bids in Kela's physiotherapy procurement auctions. The study is executed by comparing the bids of Kela's procurement to the bids of procurement of municipalities.

The minimum quality constraints and criteria of the two procurement are quite similar, which enables comparing. Kela is always using auctions as their procurement method and, in most of the cases, municipalities are too. Yet, some municipalities have also negotiated because of too few participants in the auction.

However, there are also differences. The patients of Kela's physiotherapy might be more demanding than the patients of municipalities and, it could be that to save money, the municipalities try to push their hardest, and therefore most expensive, patients to use Kela's services.

Another difference is the freedom of choice that Kela offers to its patients. Municipalities divide their patients to the service providers so that the lowest bidder gets its capacity filled first, then the second lowest and so forth. This increases the incentives to bid as

close to the production costs as possible to get the most patients. Kela, on the other hand, allows the patients to choose the service provider they want without thinking about the prices. Hence, it might be that the one with the highest bid gets all of the customers and the lowest bidder does not get any. This then decreases the incentives to bid as low as possible, especially taking into account the fact that Kela has accepted almost all the service providers that have participated in the procurement auctions.

Kela asks the service providers to bid only one price for 45 minutes long physiotherapy service that is held in the service provider's premises. The prices for different duration and home visits are then counted from this price.

Different municipalities have different designs of how to get the prices. Some of the municipalities act like Kela but most of the municipalities ask separately different bids for different duration and home visits. When counting the averages for services of different duration procured by municipalities, it can be seen that the service providers in fact bid lower prices per minute for longer sessions. This indicates that the costs are not increasing linearly with duration. Hence, it would be beneficial for Kela to also ask different bids for different duration.

In the analysis, I first describe the data of procurement of Kela and municipalities and then compare them. The data of Kela has the procurement auctions of years 2006, 2010 and 2014 and the data of municipalities is from 2010 to 2017. There are a lot more bids in the procurement of Kela, which should yield lower prices. The average bid of Kela's procurement is lower than the average bid of procurement of municipalities, but it might be because Kela's procurement have been held earlier.

I study the procurement of municipalities and Kela descriptively after modifying the data so that the offers are comparable to each other. These results indicate that average offer

of municipalities is lower than Kela's. Also the linear regression model, which models the bids in euros per minute based on the procurer, year of procurement, duration of service and other information about the type of the service hints to the same direction. According to the model changing the procurer from municipalities to Kela increases the prices per minute by about 8 cents, the result being statistically significant. My results indicate that the procurement design of municipalities is better than the design of Kela. When all other variables are controlled, it seems that freedom of choice yields to higher prices of physiotherapy.

The topic could be researched further with the information of the capacity that the service providers participating in procurement have, how the patients were actually divided among the service providers and what were the realized costs. This would provide more input to the discussion about the freedom of choice.

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